Notice of Allowability	Application No.	Applicant(s)
	09/624,385	KATAYAMA ET AL.
	Examiner	Art Unit
	Jin-Cheng Wang	2628

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *4/4/2006 & 2/15/2006*.

2. ☒ The allowed claim(s) is/are *1,5,8 and 11*.

3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☒ All   b) ☐ Some*   c) ☐ None   of the:

      1. ☒ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

    * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application. **THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.

    (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached

      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.

    (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

    Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)

2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)

3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____

4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material

5. ☐ Notice of Informal Patent Application (PTO-152)

6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .

7. ☐ Examiner's Amendment/Comment

8. ☒ Examiner's Statement of Reasons for Allowance

9. ☐ Other _____.

Reasons for Allowance

1.   The following is an examiner's statement of reasons for allowance of claims 1 and 5 in

the amendment of 2/15/2006: Nothing in the prior art anticipates or suggests, "a setting step, of

automatically selecting and setting one mapping mode out of a plurality of mapping modes based

on image placement information of the horizontal and vertical placement direction of the

plurality of images having a common subject region" in an image synthesis method comprising

an input step of inputting a plurality of image data representing a plurality of images; a

placement information generating step of generating placement information about horizontal and

vertical placement direction of the plurality of images, determined by the horizontal and vertical

placement direction of the plurality of images represented by the image data inputted in the input

step; a placement information obtaining step of obtaining the placement information about a

plurality of images in which adjacent images have a common subject region; a setting step of

automatically selecting and setting one mapping mode output of a plurality of mapping modes

based on image placement information of the horizontal and vertical placement direction of the

plurality of images having a common subject region, each mapping mode corresponding to a

different mapping surface, without a user intervening to determine the mapping mode or the

corresponding mapping surface; a synthesis step of combining the plurality of images by using

the mapping mode set in the setting step; a changing step, of changing the mapping mode; and a

generating step, of issuing when an image formed by changing the mapping mode in the

changing step does not comply with a predetermined condition set in accordance with the

mapping mode, a warning and generating and displaying a synthesized image in accordance with

the predetermined condition, the warning being issued in a case in which the synthesized image

exceeds a predetermined angle of view while simultaneously generating and displaying the

synthesized image within the predetermined range of viewing angle.

2.   The following is an examiner's statement of reasons for allowance of claim 8 in the

amendment of 2/15/2006: Nothing in the prior art anticipates or suggests, "setting means for

automatically selecting and setting one mapping mode out of a plurality of mapping modes based

on image placement information of the horizontal and vertical placement direction of the

plurality of images having a common subject region" in an image synthesis apparatus

comprising: inputting means for inputting a plurality if image data representing a plurality of

images; placement information generation means for generating placement information about

horizontal and vertical placement direction of the plurality of images, determined by the

horizontal and vertical placement direction of the plurality of images represented by the image

data inputted by the inputting means; placement information obtaining means for obtaining the

placement information about a plurality of images in which adjacent images have a common

subject region; setting means for automatically selecting and setting one mapping mode out of a

plurality of mapping modes based on image placement information of the horizontal and vertical

placement direction of the plurality of images having a common subject region, each mapping

mode corresponding to a different mapping surface, without a user intervening to determine the

mapping mode or the corresponding mapping surface; synthesis means for combining the

plurality of images by using the mapping mode set by the setting means; changing means for

changing the mapping mode; generating means for issuing, when an image formed by changing

the mapping mode by the changing means does not comply with a predetermined condition set in

accordance with the mapping mode, a warning and generating and displaying a synthesized

image in accordance with the predetermined condition, the warning being issued in a case in

which the synthesized image exceeds a predetermined angle of view while simultaneously

generating and displaying the synthesized image within the predetermined range of viewing

angle; and display means for displaying a cuttable rectangular region without a margin in the

synthesized image.

3.   The following is an examiner's statement of reasons for allowance of claim 11 in the

amendment of 2/15/2006: Nothing in the prior art anticipates or suggests, "*a setting step of*

automatically selecting and setting one mapping mode out of a plurality of mapping modes based

on image placement information of the horizontal and vertical placement direction of the

plurality of images having a common subject region" in a computer-generated storage medium

having recorded thereon a program for implementing a computer-implementable image synthesis

method for combining a plurality of images, the program comprising: an input step, of inputting

a plurality of image data representing a plurality of images; a placement information generating

step of generating placement information about horizontal and vertical placement direction of the

plurality of images, determined by the horizontal and vertical placement direction of the plurality

of images represented by the image data inputted in the input step; a placement information

obtaining step of obtaining the placement information about a plurality of images in which

adjacent images have a common subject region; a setting step of automatically selecting and

setting one mapping mode out of a plurality of mapping modes based on image placement

information of the horizontal and vertical placement direction of the plurality of images having a

common subject region, each mapping mode corresponding to a different mapping surface,

without a user intervening to determine the mapping mode or the corresponding mapping

surface; a synthesis step of combining the plurality of images by using the mapping mode set in

the setting step; a changing step of changing the mapping mode; and a generating step of issuing

when an image formed by changing the mapping mode in the changing step does not comply

with the a predetermined condition set in accordance with the mapping mode, a warning and

generating and displaying a synthesized image in accordance with the predetermined condition,

the warning being issued in a case in which the synthesized image exceeds a predetermined

angle of view while simultaneously generating and displaying the synthesized image within the

predetermined range of viewing angle.

The cited reference, Teo U.S. Patent No. 6,246,413, does not teach *automatically*

selecting and setting the mapping mode. Xiong et al. U.S. Patent No. 6,434,265 teaches in

figures 2 and 3 a user interface and *a global optimization* that *automatically* provides feedback to

the computer system when the pair-wise objective function is not desirable for a poor selection

of the projection viewing plane and the resulting panoramas will have imperfectly aligned

images that give shadow or ghosting effects due to a poor selection of the projection viewing

plane and the resulting panoramas will have imperfectly aligned images that give shadow or

ghosting effects. Xiong further teaches an alternative human interaction being present throughout

the image synthesis process to provide feedback to the computer system in all the nonlinear

optimizations to let users monitor the progress of the system and allow them to intervene **when**

necessary. Xiong discloses that a panorama is constructed on a particular geometry that will best

facilitate the rendering of the projection onto a chosen viewing plane (a geometric surface) such

as cubic, polyhedral, cylindrical and spherical geometries. Xiong describes that a user can

alternatively intervene to select a viewing plane. Xiong discloses that upon the user's intervening

of selecting a viewing plane, the computer program automatically selecting and setting the

mapping mode in accordance to the parameters set by the user's intervening action. Teo teaches

that the viewing software can *automatically* invert the projection by automatically straightening

out the portion of the panoramic image being displayed (column 7-8). Teo teaches in column 10

the mapping mode of mapping onto the planar surfaces such as mapping the panorama images

onto a cube and the mapping mode of mapping the panorama images onto polyhedral surfaces to

form cylindrical panorama images. Once the geometry is selected either by a user or **by the**

viewer software, the image processor automatically transforms the first digital panoramic image

into a second digital panoramic image corresponding to the projection of the scene onto the

surface geometry. Therefore, the mapping mode is automatically selected and set by the viewer

software because the steps involved a mode in the mapping or a mode in transforming the first

digital panoramic image into a second digital panoramic image corresponding to the projection

of the scene onto the changed/selected geometric surface are automatically performed by the

software. Although Teo teaches that a user can change a mapping surface (column 11, lines 1-9)

by adjusting the shape of the mapping surfaces so that a given cylindrical panoramic image can

be transformed to produce a modified panoramic image, the procedure can be automated by the

computer software. Teo therefore teaches *automatically* selecting and setting a mapping mode or

changing the plane for mapping the panoramic image by the computer through a user interface or

by the computer software without the user interface. Teo further discloses the horizontal

placement of image by projecting a scene onto a cube so that horizontal lines of the scene appear

horizontal in the panoramic image, and vertical placement of image by projecting the panoramic

image on the *vertical cylinder* or by rotating the polyhedral surface relative to a cylindrical

panoramic image and making adjustments to the sides and edges of the polyhedral surface so that

the placement of images appear vertically on the mapping surface and thus selecting and setting

a mapping mode with the mapping surface being adjusted without a user intervention. Teo

teaches the user interface enabling the user to rotate the polyhedral surface relative to a

cylindrical panoramic image and making adjustments to the sides and edges of the polyhedral

surface so that the placement of images appear vertically on the mapping surface. However,

neither Teo or Xiong discloses the claim limitation of "*a setting step of automatically selecting*

and setting one mapping mode out of a plurality of mapping modes based on image placement

information of the horizontal and vertical placement direction of the plurality of images having a

common subject region"set forth in the independent claim 1, 8 and 11.

Shum et al. U.S. Patent No. 6,271,855 teaches a plurality of mapping modes such as

zooming and panning the screen images of the interior scene shown in the panoramic view of

Fig. 10A wherein the mapping surfaces within panoramas are different and changing the type of

panoramas such as the spherical panoramas and the planar panoramas. Shum teaches a setting

step of zooming/panning the panorama and setting the spherical panoramas by the interactive

user interface so that the mapping mode changes in which each resulting panorama has different

mapping surfaces. Shum further teaches determining the constraints governing the mapping

mode of the mapping onto the projection plane wherein the constraints incorporates the

predetermined panoramic view of a 3D scene or the predetermined camera orientation matrix by

the governing linear systems of equations. Shum further teaches generating a warning message to

indicate that the constraint equations are unsolvable in a case in which the synthesized image is

not aligning with any portion of the projected model in response to the change in the geometric

constraints determined by the projection plane or in response to the change in the panoramic

view. The geometric constraints change due to the change in the projection plane from a planar

panorama to a spherical panorama wherein the planes within the spherical panorama are changed

to spherical planes and the panorama view can be changed as well by zooming/panning

panorama and/or selecting a portion of the panorama. Therefore, un-solvability of the linear

equations occurs *in the process of changing the mapping mode* because the change in the

mapping mode or the change in the geometric surface also changes the geometric constraints

governing the linear equations. When the linear systems of equations are not solvable, a user can

switch the mapping plane orientation or changing the mode of projection surface to meet the

constraint equations requirements wherein the plane normals have changed. Moreover, the

projection space can be in the form of any shape such as spherical or planar and by changing the

camera's point of view and/or the panorama view and the coordinates and directions of the plane

normals, the projection space is effectively changed and accordingly the mapping mode is

changed.

However, Shum teaches changing the mapping mode by zooming and panning the screen

images of the interior scene shown in the *initial* panoramic view of Fig. 10A (See Figs. 11A and

11B and column 23-24) and changing the type of panoramas such as the spherical panoramas

(Figs. 15A-15B) and the planar panoramas (Figs. 16A-16B). Shum teaches a setting step of

zooming/panning the panorama and setting the spherical panoramas (column 23-24) by the

interactive user interface so that the mapping mode changes wherein each resulting panorama

has different mapping surfaces in accordance with the user input commands (column 23-24)

wherein the panorama mapping surfaces change as a result of the zooming and panning.

However, Shum does not disclose the claim limitation of "*a setting step of automatically selecting and setting one mapping mode out of a plurality of mapping modes based on image placement information of the horizontal and vertical placement direction of the plurality of images having a common subject region*" set forth in the independent claim 1, 8 and 11.

4.   Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."
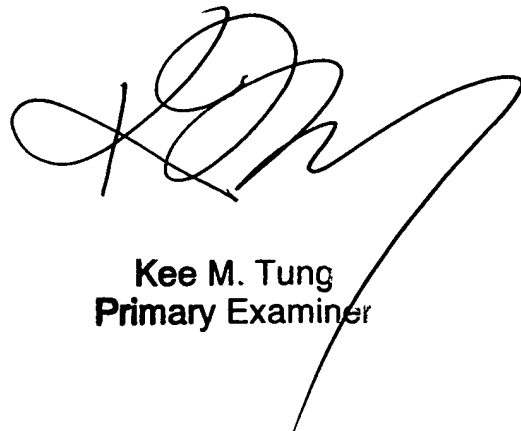
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jin-Cheng Wang whose telephone number is (571) 272-7665. The examiner can normally be reached on 8:00 - 6:30 (Mon-Thu).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kee Tung can be reached on (571) 272-7794. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

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system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

jcw

Kee M. Tung
Primary Examiner